SASKATCHEWAN RESEARCH COUNCIL

CLIMATOLOGICAL REFERENCE STATION

ANNUAL SUMMARY, 1983

by

E.E. Wheaton

J.G. Calvert

R.M. Begrand

SRC Technical Report No. 149

Publication E-906-3-B-84

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DEDICATION

This work is dedicated to J.L. Bergsteinsson and J.G. Calvert. J.L. Bergsteinsson established the climate reference station in 1964 and managed it until April, 1983. J.G. Calvert was the chief observer from February, 1968 until his recent retirement.

ACKNOWLEDGEMENTS

The Saskatchewan Research Council gratefully acknowledges the financial support of the Atmospheric Environment Service, Environment Canada, which supports in part the operations of the benchmark station through a contractual agreement.

The observing program owes much to the careful work of J.G. Calvert, senior research technologist (chief observer until August, 1983), R. Begrand (chief observer after August, 1983), R. Jahren, J. Ross and B. Smith. Much assistance in the maintenance of the computer archive was provided by C. McKenzie.

Discussions with Mr. D.J. Bauer, officer-in-charge, and the staff of the Saskatoon Weather Office have proven most helpful.

Technical drafting for this report was done by Carlos Sardinha.

Darlene Diduck typed the bulk of this report.

Enquiries concerning the climatological reference station data and its measurement programs are welcome.

E.E. Wheaton
Research Scientist
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ABSTRACT

Data concerning temperature, precipitation, soil temperature, evaporation, wind speed, bright sunshine and solar radiation at Saskatoon SRC (52°09'N, 106°36'W, 497 m MSL) are presented for the calendar year 1983 and compared with the historic record.

The year 1983 was 0.3°C warmer than the mean annual temperature established for the standard period 1951-1980 and total precipitation for the year was 101.1 mm greater than the normal established during the 1951-1980 period.

The most memorable record set in 1983 was the 24 hour rainfall of 99.4 mm which fell during the storm of June 24. This storm's rainfall intensity was greater than the long term 24 hour extreme by 20.2 mm.

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HISTORY AND STATION LOCATION

The first meteorological observations appear to have been taken at or near Saskatoon by the Royal Northwest Mounted Police in 1889. At first only temperatures were recorded. There were a number of changes made in the coordinates and as a result there is some disagreement in the early records as to the exact location of the weather observing point. The bulk of the evidence, however, indicates that the location was 52 degrees 15 minutes north and 106 degrees 20 minutes west, elevation 480 m above sea level. This would place it at Clark's Crossing, on the South Saskatchewan River, approximately 10 miles north and east of the center of the present City of Saskatoon. At that time there was a settlement at Clark's Crossing and also about 10 or 15 families on either side of the river at Saskatoon.

Not too much is known about the early observers. However, the records show that a Major T.H. Keenan took the observations from March, 1892 until March, 1895. Mr. George Will was the observer from January, 1897 until April, 1897. It is thought that Thomas H. Copeland was involved in the observational program from 1895 to May 1, 1901, at which time it was taken over by Mr. Eby, senior. Continuous observations were taken by the Eby's at a site on 8th Street until October 31, 1942, when the station was closed. Mr. Eby continued the program until his death in 1921. His daughter, Miss E.S. Eby, recorded the observations until April, 1931 and was replaced by her brother, J.M. Eby, who continued the program until the station was closed. The Eby station recorded temperature, precipitation and weather notes on fog, thunderstorms, winds and any unusual weather phenomena. Reports were made twice daily, morning and evening.

In 1916 a climatological station was established by the Physics Department of the University of Saskatchewan and continuous observations were kept twice daily until January 15, 1965. The long time observer at this site was Mr. Sidney Cox, who retired from this work when the Saskatchewan Research Council took over the program at our newly established Climatological Reference Station.

The location of the Saskatchewan Research Council's Climatological Reference Station is latitude 52°09'N and longitude 106°36'W and the elevation is 497 m above mean sea level.* The long time observer (16 years) at this present site was Mr. Joe Calvert, who retired from the program in August, 1983.

*From various sources including the Physical Environment of Saskatoon, Canada (E.A. Christiansen ed.) and 1974 Annual Meteorological Summary, Saskatoon, Saskatchewan, Environment Canada, Atmospheric Environment Service.

FOOTNOTES TO CLIMATIC TABLES

1 The quantities recorded in this column are defined as the element value for the reported year minus the element value for the previous year. The 1983 Mean Annual Temperature was 2.1°C while the 1982 Mean Annual Temperature was 0.4°C, giving a difference of 1.7°C (see Table 1). In 1983 there were 207 Days with Frost, the same number as for 1982.

2 In climatology it is often useful to make spatial comparisons of particular element values over a common time period. At an interior continental site such as Saskatoon, a period of 30 years is required to produce statistically stable estimates of the more variable elements. To facilitate spatial comparisons, World Meteorological Organization currently recommends the standard period January 1, 1951 to December 31, 1980 for data analysis. Items in this column conform to this standard, except where noted. Extreme values in this column are the extremes recorded in this standard period.

3 Temporal comparisons at a point are also of value in some types of climatic studies. Therefore it is desirable to produce the maximum length of reliable climatic record to carry out studies over a period of time. Data in this column are drawn from the following data sets:

Saskatoon SRC	1964 to 1982
Saskatoon U. of S.	1916 to 1963
Saskatoon	1892 to 1915

Station locations, exposures and measurement procedures were subject to change during this time period. Data presented in this column are unadjusted and users are cautioned accordingly.

4 The Mean Annual Temperature is defined as the average of the Daily Mean Temperatures for one year. In the monthly summaries, (Tables 2 to 13) the Daily Mean Temperature reported is the average of the Daily Mean Temperatures for one month under consideration. In turn, the Daily Mean Temperature for a particular day is defined as the arithmetic mean of the Daily Maximum Temperature and the Daily Minimum Temperature for the date. The Normal records used for comparison purposes are those published in Volume Two of the Atmospheric Environment Service publication "Canadian Climate Normals, 1951-1980, Temperature".

5 The Mean Maximum Temperature tabulated is the mean of the Daily Maximum Temperatures for one year in the case of Table 1 and for particular months in the cases of Tables 2 to 13. For details concerning measurement procedures, the reader is referred to the Atmospheric Environment Service publication Manual of Climatological Observations, second edition, January, 1978. The normal values are published in the Volume Two of the Canadian Climate Normals (note 4).

6 The Mean Minimum Temperature as tabulated is defined as the mean of the Daily Minimum Temperatures averaged over the appropriate time periods. Refer to note 5 above concerning measurement procedures and normals.

7 The word Extreme refers to the highest or lowest value of a particular element recorded during the period in question. The highest temperature recorded at Saskatoon SRC during 1983 was 36.5°C while the highest value ever recorded at Saskatoon was 40.0°C (see Table 1).

8 A Day with Frost is recorded on each occasion when the Daily Minimum Temperature is equal to or less than 0°C.

9 A Heating Degree-Day (HDD) is an index or the heating requirement to achieve a stipulated comfort value in an indoor environment. For most purposes, a temperature of less than 18°C is considered uncomfortable and supplementary heating is required. On a specific day, the amount by which 18°C exceeds the Daily Mean Temperature defines the number of Heating Degree-Days for that day. Mathematically:

$$HDD = (18^{\circ}C - \overline{T}), \text{ for that day,}$$
where $\overline{T}$ = Daily Mean Temperature in °C
If $\overline{T}$ is equal to or greater than 18°C, HDD = 0.

Monthly and annual values of HDD are obtained by summing daily values. The normal used for comparison purposes is the adjusted normal published in the Atmospheric Environment Service publication Volume Four of the "Canadian Climate Normals, 1951-1980, Degree Days". The procedure used to adjust the means for stations with five to nineteen years of data is indicated in this volume. An adjustment is required to make the mean comparable to the thirty year normal.

10 In order for plant growth to proceed, air temperature must exceed a critical value appropriate to the plant species in question. For many members of the grass family, including most commercial cereals grown on the prairies, a base temperature of 5.0°C has been established. On a specified day, the difference between the Daily Mean Temperature and the 5.0°C base temperature defines the number of Growing Degree-Days (GDD). Mathematically:

$$GDD = (\overline{T} - 5.0^{\circ}C), \text{ for that day,}$$
where $\overline{T}$ = Daily Mean Temperature in °C
If $\overline{T}$ is equal to or less than 5.0°C, GDD = 0.

Daily GDD values are summed to provide totals for the appropriate month, growing season or year. The normal value used for comparison is given in the Volume Four of the "Canadian Climate Normals, 1951-1980, Degree Days".

11 Total precipitation is the sum of the daily rainfall and daily snowfall amounts recorded. The snowfall component of precipitation is recorded as an equivalent amount of liquid water. For particulars on precipitation measurement procedures and instruments, the reader is referred to the Atmospheric Environment Service publication Manual of Climatological Observations, second edition, January, 1978. The notation T in this column refers to a trace of precipitation (less than 0.2 mm water equivalent). The normal records used for comparison purposes are those published in Volume Three of the Atmospheric Environment Service publication "Canadian Climate Normals, Temperature, 1951-1980".

12 Note that prior to 1960, measurement of snowfall was accomplished using snow rulers set vertically in the ground to obtain the thickness of the newly deposited layer. In obtaining precipitation values a standard water equivalent of one inch of snow yielding one-tenth inch of water was assumed. Since these measurements were inaccurate due to snow drifting, compaction and varying water equivalent, the Nipher snow gauge which actually catches snow has been employed at a number of stations (including Saskatoon) in more recent years.

13 A Precipitation Day is recorded on occasions when the amount of precipitation in a 24-hour period equals or exceeds 0.2 mm water (0.01 inch in English units). If both rain and snow occur on the same day, a snow day, a rain day and a precipitation day are all recorded. If only one form of precipitation occurs on a specified date, a precipitation day, a rain day or a snow day are recorded appropriately. Beginning in 1974, observations at Saskatoon SRC refer to the Calendar day. Previous to 1974, the so-called climatological day, beginning at 9 a.m. standard time on the date of reference and ending at 9 a.m. the next morning, was employed in record-keeping. An asterisk (*) appearing in the Normal column denotes the occurrence of measureable precipitation on one or more occasions but the 30-year mean when calculated amounts to less than a trace.

14 Evaporation measurements are carried out in the period May 1 to September 30 only, using the International Hydrological Decade class A pan. The data reported is the sum of the daily net evaporation. Particulars of the measurement procedure are contained in the Atmospheric Environment Service publication Evaporation, May, 1978. The data base available for comparison is the Saskatoon SRC record for the period 1964 to 1982. The notation M refers to missing data.

15 The Mean Wind Speed value reported is the mean of the hourly wind speeds for the period in question. Average hourly wind speeds are obtained from recording instruments. The anemometer employed is a propeller-type aerofoil at a height of 10 m. Normals used for comparison purposes are those of Saskatoon Airport, from the Atmospheric Environment Service publication Canadian Normals, Volume 5, Wind 1951-1980.

16 Peak Gust refers to the highest instantaneous value recorded by the anemometer system for the period of reference, irrespective of direction and/or duration. Comparison is again with published data for Saskatoon Airport.

17 Total Bright Sunshine is the sum of the daily bright sunshine value in hours and tenths of hours as recorded by a Campbell-Stokes sunshine recorder. Atmospheric Environment Service publication Sunshine, July 1974 and Daily Bright Sunshine, 1951-1980, Volume 7 supply information on measurement procedures and normals respectively.

18 Percent Possible Sunshine Hours refers to the ratio of measured bright sunshine hours to total daylight hours in a given period, expressed as a percentage.

19 Total Global Solar Radiation is the sum of the daily values of short wave solar radiation recorded during the period in question. Measurements are carried out on a horizontal surface at the ground and integrated over the whole celestial dome, summing the diffuse and direct components of the solar beam. The measuring instrument is a temperature-compensated pyranometer. The unit of measurement quoted, the Langley, is defined as one calorie per square centimetre. Comparison is with a provisional Normal based on five years of data.

20 The Year/Day entry appearing in Tables 2 to 13 refers to the year and day on which an extreme event occurred. Reference to the month appears in the table heading. For example, referring to Table 2, the warmest day in January, 1983 was the 9th (also the 10-12th) with a high temperature of 0.0°C while the warmest January day on record was January 30, 1931 with a high temperature of 10.0°C.

21 Due to missed observations, faulty instrument calibration, lost records, etc., only partial data are available from the period 1892 to 1979, particularly in the period prior to 1915. The number of years of useful record is therefore cited.

22 Soil Temperature, under a short grass surface of which normal snow accumulation occurs in winter, is measured according to procedures outlined in the Atmospheric Environment Service publication Soil Temperature, January 1, 1976. If the observed soil temperature at any depth is equal to or less than 0°C on any occasion during the reference period, the question is answered Yes.

23 Depths below surface at which soil temperature measurements are made are: 5 cm, 10 cm, 20 cm, 100 cm, 150 cm and 300 cm. Since soil temperature is affected by profile structure and water content, extrapolation of the measured data is difficult.

TABLE 1. Annual Climatic Summary, Saskatoon SRC, 1983.

Element	1983 Value	Difference From 1982[1]	Difference From Normal[2]	Difference All Years[3]
Mean Annual Temperature[4] (°C)	2.1	1.7	0.3	
Mean Maximum Temperature[5] (°C)	7.6	1.5	0.1	
Mean Minimum Temperature[6] (°C)	-3.3	2.0	0.7	
Extreme Maximum Temperature[7] (°C)	36.5 (Aug.)	5.5		-3.5
Extreme Minimum Temperature[7] (°C)	-39.5 (Dec.)	0.5		10.5
Days with Frost	207	0	7	
Heating Degree-Days[9] (18°C base)	5904	-560	-125	
Growing Degree-Days[10] (5°C base)	1638	117	2	
Total Precipitation[11] (mm)	471.6	35.4	101.1	
Total Rainfall[11] (mm)	329.2	27.3	86.2	
Total Snowfall[12] (cm)	142.4	8.1	24.4	
Greatest 24-hr Precipitation (mm)	99.4 (June)	67.0		20.2
Greatest 24-hr Rainfall (mm)	99.4 (June)	67.0		20.2
Greatest 24-hr Snowfall (cm)	26.2 (May)	8.6		-30.7
Precipitation Days[13]	132	2	16	
Rainfall Days[13]	74	9	15	
Snowfall Days[13]	65	-6	3	
Total Evaporation[14] (mm)	959.0	92.8	-16.7	
Mean Wind Speed[15] (km/hr)	13.9	0.3	-3.6	
Peak Wind Gust[16] (km/hr)	91 (June)	4		
Total Bright Sunshine[17] (hr)	2191	-175	-259	
Total Global Radiation[19] (Langleys)	108623	254	-8008	

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 2. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR JANUARY 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE[2] 1951-80	EXTREME ALL YEARS[3]
Monthly Mean Temperature[4] (°C)	-13.0	-26.5	-19.1	
Monthly Mean Maximum Temperature[5] (°C)	-8.0	-20.5	-14.2	
Monthly Mean Minimum Temperature[6] (°C)	-18.0	-32.5	-23.9	
Extreme[7] Maximum Temperature (°C)	0.0	6.0	6.1	10.0
Day/Year[20]	1983/9-12	1982/6		1931/30
Years of Record[21]	1	1	17	84
Extreme[7] Minimum Temperature (°C)	-37.5	-40.0	-43.9	-48.8
Year/Day[20]	1983/25	1982/10/19		1893/31
Years of Record[21]	1	1	17	84
Days with Frost[8]	31	31	31	
Heating Degree-Days[9] (18°C base)	955.5	1386	1149.4	
Growing Degree-Days[10] (5°C base)	0.0	0.0	0.0	
Total Precipitation[11] (mm)	13.7	15.0	22.6	
Total Rainfall[11]	TR	0.3	0.1	
Total Snowfall[12] (cm)	13.7	14.7	21.2	
Greatest 24-hour Precipitation (mm)	3.2	3.5	12.4	17.8
Year-Day[20]	1983/23	1982/24		1941/15
Years of Record [21]	1	1	17	84
Greatest 24-hour Rainfall (mm)	TR	0.3	1.8	2.0
Year/Day[20]	1983/22/31	1982/14		1941/10
Years of Record[21]	1	1	17	84
Greatest 24-hour Snowfall (cm)	3.2	3.5	12.4	17.8
Year/Day[20]	1983/23	1982/24		1941/15
Years of Record [21]	1	1	17	84
Precipitation Days [13]	12	16	13	
Rainfall Days[13]	0*	1	*	
Snowfall Days[13]	12	16	13	
Total Evaporation[14](mm)	M	M	M	
Mean Wind Speed[15] (km/hr)	11.7	12.5	16.8	
Peak Gust Speed[16]	60.0	65.0	97.0	
Total Bright Sunshine[17] (hr)	78.8	122	103.1	
Percent Possible Bright Sunshine[18]	31	48	40	
Total Global Radiation[19] (Langleys)	2775	3479	3168	
Soil Frozen?[22]	YES	YES		
Frozen Levels[23] (cm)	5,10,20 50,100	5,10,20 50,100 150		

SUMMARY: January 1983 was a rather pleasant month from the temperature viewpoint, with the monthly mean 6° above the normal for the period 1951 to 1980. However, the month was a rather dull one with only 80 per cent of the normal 99 hours of bright sunshine.

Winds during January 1983 were substantially below the long-term average of 16.8 km/hr; only an 11.7 km/hr average speed was achieved in the past January.

On average, January 22 is the coldest day of the winter at Saskatoon. Typically, the end of winter occurs about April 7, based on snow cover and temperature criteria. Now that, hopefully, the most extreme winter weather is behind us, it is interesting to note that the lowest temperature experienced so far this winter is -37.5°c, far above the all-time low temperature of -48.8°c. Precipitation since November 1 has totalled 55.8 mm as compare to a normal for the same period of 64.4 mm. Normal temperatures for three winter months run -12.8°c while for the November-January period in 1982-83 the temperature averaged -11.6°c.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 3. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR FEBRUARY 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE[2] 1951-80	EXTREME ALL YEARS[3]
Monthly Mean Temperature[4] (°C)	-10.0	-16.0	-14.5	
Monthly Mean Maximum Temperature[5] (°C)	-6.0	-11.0	-9.3	
Monthly Mean Minimum Temperature[6] (°C)	-14.0	-20.5	-19.7	
Extreme[7] Maximum Temperature (°C)	5.5	5.0	6.1	12.8
Day/Year[20]	1983/25	1982/21		1931/19
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	-25.5	-33.5	-41.1	-50.0
Year/Day[20]	1983/5	1982/2/5		1893/19
Years of Record[21]	1	1	17	87
Days with Frost[8]	28	28	28	
Heating Degree-Days[9] (18°C base)	782	950	920.4	
Growing Degree-Days[10] (5°C base)	0.0	0	0	
Total Precipitation[11] (mm)	12.6	5.7	21.9	
Total Rainfall[11]	TR	0.0	0.4	
Total Snowfall[12] (cm)	12.6	5.7	18.5	
Greatest 24-hour Precipitation (mm)	7.1	1.9	14.2	20.3
Year-Day[20]	1983/27	1982/6		1918/7
Years of Record[21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	TR	0.0	1.8	8.1
Year/Day[20]	1983/10/26/27			1953/3
Years of Record[21]	1	1	17	87
Greatest 24-hour Snowfall (cm)	7.1	1.9	14.2	20.3
Year/Day[20]	1983/27	1982/6		1918/7
Years of Record[21]	1	1	17	87
Precipitation Days[13]	12	8	11	
Rainfall Days[13]	*	0	*	
Snowfall Days[13]	12	8	10	
Total Evaporation[14](mm)	M	M	M	
Mean Wind Speed[15] (km/hr)	14.4	13.7	16.4	
Peak Gust Speed[16]	58.0	63.0	85	
Total Bright Sunshine[17] (hr)	58	141	135.1	
Percent Possible Bright Sunshine[18]	21	51	49	
Total Global Radiation[19] (Langleys)	4137	5225	5566	
Soil Frozen?[22]	YES	YES	YES	
Frozen Levels[23] (cm)	5,10,20 50,100	5,10,20 50,100,150	5-150	

SUMMARY:

When is March 16 twenty-eight days long? Why in February, 1983! During the past month, the average temperature was -10° C, equivalent to the 7-year average temperature for March 16. In the 20th century only six Februarys have been warmer, the most recent of these being February, 1977 with a mean temperature of -6° C. Only four days with below normal temperatures were experienced in February.

Precipitation during February was 58 per cent of normal, bringing the total since October 1 to 80.6 mm, or 78 per cent of normal for the period.

Other items of interest were the lack of sunshine with 43 per cent of normal hours, light winds with 88 per cent of normal speed and heating degree-days with 85 per cent of normal accumulation.

Frost in the soil has now reached a depth of 1 meter.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 4. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR MARCH 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE 1951-80	EXTREME ALL YEARS[3]
Monthly Mean Temperature[4] (°C)	-7.0	-8.0	-8.5	
Monthly Mean Maximum Temperature[5] (°C)	-3.0	-3.5	-3.5	
Monthly Mean Minimum Temperature[6] (°C)	-10.5	-12.5	-13.6	
Extreme[7] Maximum Temperature (°C)	6.5	4.5	15.0	22.8
Day/Year[20]	1983/11	1982/27		1910/23
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	-23.0	-30.5	-38.9	-43.3
Year/Day[20]	1983/19	1982/8		1897/4
Years of Record[21]	1	1	17	87
Days with Frost[8]	31	30	31	
Heating Degree-Days[9] (18°C base)	775	812	826	
Growing Degree-Days[10] (5°C base)	0	0.0	0.9	
Total Precipitation[11] (mm)	30.1	21.1	22.3	
Total Rainfall[11]	2.8	0.3	1.1	
Total Snowfall[12] (cm)	27.3	20.8	19.5	
Greatest 24-hour Precipitation (mm)	8.8	9.2	32.0	56.9
Year-Day[20]	1983/1	1982/17		1967/30
Years of Record [21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	1.0	0.3	7.1	7.7
Year/Day[20]	1983/12	1982/29		1938/29
Years of Record[21]	1	1	17	87
Greatest 24-hour Snowfall (cm)	8.8	9.2	32.0	56.9
Year/Day[20]	1983/1	1982/17		1967/30
Years of Record [21]	1	1	17	87
Precipitation Days [13]	16	11	10	
Rainfall Days[13]	6	1	1	
Snowfall Days[13]	14	10	10	
Total Evaporation[14](mm)	M	M	M	
Mean Wind Speed[15] (km/hr)	16.5	15.6	17.5	
Peak Gust Speed[16] (km/hr)	67.0	74.0	93	
Total Bright Sunshine[17] (hr)	103	157	190.1	
Percent Possible Bright Sunshine[18]	28	43	52	
Total Global Radiation[19] (Langleys)	8460	9071	10,100	
Soil Frozen?[22]	YES	YES	YES	
Frozen Levels[23] (cm)	5,10,20 50,100	5,10,20 50,100,150	5-150	

SUMMARY:

The end of March, 1983 effectively marked the end of the winter of 1982-83. Snowmelt was proceeding vigourously with a decline in snow depth of 2.9 cm between March 15 and March 31. The 7.4 cm of snow remaining on March 31 had a water equivalent of 27 mm, promising a favorable soil moisture picture for the early spring of 1983. The past winter was substantially warmer than normal. The average temperature for the "cold" months (November through March) is -12.1°C. In 1982-83, the average for the same period was -10.4°C, some 1.7°C above normal. Only November displayed a temperature below the 30-year average. Winter precipitation 98.5 mm water equivalent compared to a normal of 108.6 mm.

March, 1983 was the dullest March on record with only 103 hours of bright sunshine recorded. Records extending to 1915 show the second dullest March was in 1931, with 134 hours recorded. Otherwise March was warm and wet.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 5. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR APRIL, 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE[2] 1951-80	EXTREME ALL YEARS[3]
Monthly Mean Temperature[4] (°C)	3.0	2.0	3.4	
Monthly Mean Maximum Temperature[5] (°C)	8.5	8.5	9.0	
Monthly Mean Minimum Temperature[6] (°C)	-2.5	-4.5	-2.3	
Extreme[7] Maximum Temperature (°C)	22.5	24.0	30.6	30.6
Day/Year[20]	1983/24	1982/22/23	-	1952/28
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	-18.0	-21.5	-27.8	-28.3*
Year/Day[20]	1983/12	1982/3	--	1893/1954
Years of Record[21]	1	1	17	87
Days with Frost[8]	22	23	22	
Heating Degree-Days[9] (18°C base)	451	481	440	
Growing Degree-Days[10] (5°C base)	52	54	47	
Total Precipitation[11] (mm)	41.7	14.1	21.4	
Total Rainfall[11]	10.0	6.6	10.7	
Total Snowfall[12] (cm)	31.7	7.5	10.0	
Greatest 24-hour Precipitation (mm)	18.7	4.8	19.3	30.2
Year-Day[20]	1983/10	1982/18	--	1935/9
Years of Record [21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	9.8	4.8	11.7	26.7
Year/Day[20]	1983/25	1982/18	--	1935/19
Years of Record[21]	1	1	17	87
Greatest 24-hour Snowfall (cm)	18.5	4.7	18.0	20.3
Year/Day[20]	1983/10	1982/1	--	1932/29
Years of Record [21]	1	1	17	87
Precipitation Days [13]	6	10	7	
Rainfall Days[13]	2	4	5	
Snowfall Days[13]	6	6	4	
Total Evaporation[14](mm)	M	M	(May-Sept. only)	
Mean Wind Speed[15] (km/hr)	15.6	15.9	19.0	
Peak Gust Speed[16] (km/hr)	58	75.0	108	
Total Bright Sunshine[17] (hr)	253	253	232	
Percent Possible Bright Sunshine[18]	61	61	56	
Total Global Radiation[19] (Langleys)	12,921	12,593	12,400	
Soil Frozen?[22]	No	YES	YES	
Frozen Levels[23] (cm)	--	5,10,20, 50, 100, 150	5-150	

* 1893/5
* 1954/2

SUMMARY:

We had a slightly below normal April temperature in spite of sixteen days with above normal temperatures. There were nine consecutive days of above normal temperatures from the 17th to the 25th. The soil is no longer frozen.

Heating Degree Days (HDD) were slightly above the normal. On the other hand, growing Degree Days (GDD) were above normal due to the several days of warm weather from the 17th to the 25th.

Precipitation was in the order ot 195% of the normal. Rainfall was slightly less than the normal; however snow was plentiful in the order of 317% of the April normal.

The 9.8 mm amount of rain for one day on the 5th was not that close to the April record of 11.7 mm for a 24 hours maximum.

The main event of the month was the 18.5 cm of snow which was measured at our Climate Reference Station on the 10th.

Sunshine was 109% of normal with only two days of totally overcast conditons.

Generally, it was a fairly pleasant April. The precipitation is a welcome addition to the coming growing season.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 6. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR MAY, 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE[2] 1951-80	EXTREME ALL YEARS[3]
Monthly Mean Temperature[4] (°C)	8.5	9.5	11.2	
Monthly Mean Maximum Temperature[5] (°C)	15.0	15.0	18.1	
Monthly Mean Minimum Temperature[6] (°C)	2.0	4.0	4.3	
Extreme[7] Maximum Temperature (°C)	27.0	27.5	34.0	37.2
Day/Year[20]	1983/25	1982/23/25	-	1936/27
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	-9.0	-5.5	-10.0	-12.8
Year/Day[20]	1983/11	1982/6	-	1907/6
Years of Record[21]	1	1	17	87
Days with Frost[8]	9	10	7	
Heating Degree-Days[9] (18°C base)	287	255.0	216	
Growing Degree-Days[10] (5°C base)	145	169.5	199	
Total Precipitation[11] (mm)	53.4	75.6	39.6	
Total Rainfall[11]	27.2	53.2	37.7	
Total Snowfall[12] (cm)	26.2	22.4	1.8	
Greatest 24-hour Precipitation (mm)	26.4	32.4	33.8	35.0
Year-Day[20]	1983/10	1982/20	-	1949/30
Years of Record [21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	8.8	32.4	33.8	35.0
Year/Day[20]	1983/20	1982/29	-	1949/30
Years of Record[21]	1	1	17	87
Greatest 24-hour Snowfall (cm)	26.2	9.9	4.3	22.9
Year/Day[20]	1983/10	1982/29	-	1955/3
Years of Record [21]	1	1	17	87
Precipitation Days [13]	14	13	7	
Rainfall Days[13]	14	10	1	
Snowfall Days[13]	1	5	7	
Total Evaporation[14](mm)	154	151	210	
Mean Wind Speed[15] (km/hr)	14.9	16.9	19.4	
Peak Gust Speed[16] (km/hr)	82	66.0	132	
Total Bright Sunshine[17] (hr)	282	205	292	
Percent Possible Bright Sunshine[18]	58	42	60	
Total Global Radiation[19] (Langleys)	15,072	12,061	15,748	
Soil Frozen?[22]	NO	NO	NO	
Frozen Levels[23] (cm)	-	-	-	

SUMMARY:

For the ninth consecutive month since the 28 September, 1982 Saskatoon was the recipient of snow, and as a matter of interest it was the most snowfall on record for a twenty-four hour period for the month of May.

For this time of the year it can be considered to have been the most severe storm on record.

We received 135% of the normal precipitation (Rain + Snow) but the snowfall itself was in excess of 1400% of the normal for May.

Total Snowfall since September 1982 has now reached 111.5 cm as opposed to the normal of 118.0 cm which is 95% of the normal.

Sunshine was 96% of the normal.

The mean temperature was 2.7°C below the May normal, which in turn gave us above normal heating degree-days and below normal growing days.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 7. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR JUNE, 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE[2] 1951-80	EXTREME ALL YEARS[3]
Monthly Mean Temperature[4] (°C)	15.5	15.2	15.6	
Monthly Mean Maximum Temperature[5] (°C)	22.0	22.0	22.1	
Monthly Mean Minimum Temperature[6] (°C)	9.0	8.5	9.1	
Extreme[7] Maximum Temperature (°C)	30.0	30.0	35.6	40.0
Day/Year[20]	10/1983	1982/22	-	*
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	1.0	2.0	-3.3	-3.3
Year/Day[20]	4/1983	1982/7	-	**
Years of Record[21]	1	1	17	87
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	85.5	94.5	89	
Growing Degree-Days[10] (5°C base)	319.0	304	319	
Total Precipitation[11] (mm)	117.2	50.8	59.9	
Total Rainfall[11]	117.2	50.8	59.9	
Total Snowfall[12] (cm)	0.0	0.0	0.0	
Greatest 24-hour Precipitation (mm)	99.4	16.6	45.0	57.2
Year-Day[20]	1983/24	1982/22	-	1925/25
Years of Record [21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	99.4	16.6	45.0	57.2
Year/Day[20]	1983/24	1982/22	-	1925/25
Years of Record[21]	1	1	17	87
Greatest 24-hour Snowfall (cm)	0.0	0.0	0.0	TR.
Year/Day[20]	-	-	-	1943/3
Years of Record [21]	1	1	17	87
Precipitation Days [13]	11	12	11	
Rainfall Days[13]	11	12	11	
Snowfall Days[13]	0	0	*	
Total Evaporation[14](mm)	248	202	223	
Mean Wind Speed[15] (km/hr)	15.5	11.9	18.2	
Peak Gust Speed[16] (km/hr)	91	87	101	
Total Bright Sunshine[17] (hr)	279	332	294	
Percent Possible Bright Sunshine[18]	56	67	59	
Total Global Radiation[19] (Langleys)	15,199	16,033	16,320	
Soil Frozen?[22]	NO	NO	NO	
Frozen Levels[23] (cm)	-	-	-	

* 1900/21, 1941/24 ** 1909/9, 1919/2

SUMMARY:

June 1983 should be long remembered for the very severe thunderstorm accompanied by a very intense record rainfall which pulverized the City from 5:30 p.m. till approximately 6:15 p.m. on Friday the 24 of June.

Total record rainfall during the storm was 94.6 mm for the 45 minute period, this means that this equals 126.0 mm per hour, in addition to the above amount there was 4.8 mm in the early a.m. as well, for a day's total of 99.4 mm. The previous record for the University location was 79.2 mm for one day on 3 July 1946.

The record for one minute intense rainfall is 31.2 mm at Unionville, Maryland, U.S.A. at 3:23 p.m. 4 July 1956 and furthermore, the all time record for a 24 hour rainfall total is 1,870 mm which was recorded at Cilaos La Reunion, Indian Ocean March 15-16, 1952.

Total precipitation for Jan-Jun 1983 has now reached 143% of the normal at our climate station.

Mean temperature was slightly below the normal, and sunshine was also slightly below the normal.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 8. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR JULY 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE 1951-80	EXTREME ALL YEARS
Monthly mean Temperature[4] (°C)	19.0	17.5	18.4	
Monthly Mean Maximum Temperature[5] (°C)	24.5	24.0	25.2	
Monthly Mean Minimum Temperature[6] (°C)	13.0	11.0	11.6	
Extreme[7] Maximum Temperature (°C)	30.0	31.0	36.7	40.0
Day/Year[20]	1983/6/19	1982/30	—	*
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	7.5	5.5	1.7	0.2
Year/Day[20]	1983/18	1982/7	—	1918/25
Years of Record[21]	1	1	17	
Days with Frost[8]	0	0	0	
Heating Degree-Days[9] (18°C base)	22.0	30	32.8	
Growing Degree-Days[10] (5°C base)	433.0	397.0	416.3	
Total Precipitation[11] (mm)	68.6	79.8	56.2	
Total Rainfall[11]	68.6	79.8	56.2	
Total Snowfall[12] (cm)	0.0	0.0	0.0	
Greatest 24-hour Precipitation (mm)	18.2	18.6	45.5	79.2
Year-Day[20]	1983/3	1982/2	—	1946/3
Years of Record[21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	18.2	18.6	45.5	79.2
Year/Day[20]	1983/3	1982/2	—	1946/3
Years of Record[21]	1	1	17	87
Greatest 24-hour snowfall (cm)	0.0	0.0	0.0	0.0
Year/Day[20]	—	—	—	—
Years of Record[21]	1	1	17	
Precipitation Days[13]	13	11	11	
Rainfall Days[13]	13	11	11	
Snowfall Days[13]	0	0	0	
Total Evaporation[14](mm)	210	204.7	229.0	
Mean Wind Speed[15] (km/hr)	14.2	12.2	16.7	
Peak Gust Speed[16] (km/hr)	84	65.0	105	
Total Bright Sunshine[17] (hr)	315	317.0	341.0	
Percent Possible Bright Sunshine[18]	63	63	68	
Total Global Radiation[19] (Langleys)	16,350	15,427	17,608	
Soil Frozen?[22]	No	No	No	
Frozen Levels[23] (cm)	—	—	—	

SUMMARY:

* 1919/17
1941/19
1946/30

Summary - July 1983

With the exception of two moderate thunder-storms, one on the 3rd with 18.2 mm of rain and the other on the 20th with 15.6 mm of rain it appears that July weather was close to normal, in addition there were four other days with thunderstorms.

July 8th was very windy with a peak gust of 84 km/h in mid-afternoon the mean hourly windspeed for that day was 34 km/h.

July precipitation was 122% of the normal, and since 1 January 1983 we have reached 337.3 mm or 138% of the normal for Jan-July period.

Sunshine was 92% of July normal.

LOCATION: 52°07'N, 106°36'W, 497m MSL

TABLE 9. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR AUGUST 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE 1951-80	EXTREME ALL YEARS
Monthly mean Temperature[4] (°C)	20.0	16.0	17.2	
Monthly Mean Maximum Temperature[5] (°C)	28.4	22.0	24.2	
Monthly Mean Minimum Temperature[6] (°C)	11.6	9.5	10.2	
Extreme[7] Maximum Temperature (°C)	36.5	31.0	36.7	38.3
Day/Year[20]	6/83	1982/11	—	1961/5
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	6.0	0.0	-2.8	-2.8
Year/Day[20]	19/83	1982/27	—	1976/28
Years of Record[21]	1	1	17	87
Days with Frost[8]	0	1	0	
Heating Degree-Days[9] (18°C base)	14.0	86.5	60.1	
Growing Degree-Days[10] (5°C base)	468.5	337.5	378.7	
Total Precipitation[11] (mm)	30.0	77.8	35.1	
Total Rainfall[11]	30.0	77.8	35.1	
Total Snowfall[12] (cm)	0	0.0	0.0	
Greatest 24-hour Precipitation (mm)	8.6	21.8	24.6	73.7
Year-Day[20]	16/83	1982/2	—	1945/3
Years of Record[21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	8.6	21.8	24.6	73.7
Year/Day[20]	16/83	1982/2	—	1945/3
Years of Record[21]	1	1	17	87
Greatest 24-hour snowfall (cm)	0	0.0	0.0	0.0
Year/Day[20]	0	—	—	—
Years of Record [21]	1	1	17	
Precipitation Days [13]	7	14	10	
Rainfall Days[13]	7	14	10	
Snowfall Days[13]	0	0	0	
Total Evaporation[14](mm)	232.1	178.0	206.0	
Mean Wind Speed[15] (km/hr)	11.1	12.4	16.5	
Peak Gust Speed[16]	80	85	151	
Total Bright Sunshine[17] (hr)	340	301.0	293.0	
Percent Possible Bright Sunshine[18]	76	66	65	
Total Global Radiation[19] (Langleys)	14,184	13,411	14,445	
Soil Frozen?[22]	no	No	No	
Frozen Levels[23] (cm)	-	—	—	

SUMMARY: August temperatures have been above normal values for twenty three (23) days this month. Six days with maximum temperatures falling 2.7°C or less below the extreme maximum on record have been recorded at the Climate Reference Station. The extreme maximum temperature this month was 36.5°C falling short of the record high for that date by only 1.5°C.

Sunshine hours for the month of August have surpassed the 1951-80 normal for August by 16%.

Precipitation for the month of August has been moderate with the monthly total of 30.0 mm being 86% of the normal 1951-80 values. August of this year is relatively drier than August of 1982 when 77.8 mm of precipitation was recorded.

Total precipitation to date is 367.3 mm or 132% of the normal January-August value. Total precipitation to the end of August is high compared to the normal annual value of 370.5 mm.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 10. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR SEPTEMBER 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE 1951-80	EXTREME ALL YEARS
Monthly mean Temperature[4] (°C)	10.0	11.0	11.5	
Monthly Mean Maximum Temperature[5] (°C)	15.9	17.5	17.8	
Monthly Mean Minimum Temperature[6] (°C)	4.0	4.5	5.1	
Extreme[7] Maximum Temperature (°C)	34.0	31.0	35.6	35.6
Day/Year[20]	01/83	1982/3	—	1978/5
Years of Record[21]	1	1	16	87
Extreme[7] Minimum Temperature (°C)	-7.0	-2.0	-7.8	-11.1
Year/Day[20]	29/83	1982/30	—	1908/28
Years of Record[21]	1	1	16	87
Days with Frost[8]	9	6	5	
Heating Degree-Days[9] (18°C base)	246.5	211.0	201.3	
Growing Degree-Days[10] (5°C base)	169.0	198.0	200.8	
Total Precipitation[11] (mm)	62.2	42.0	32.2	
Total Rainfall[11]	62.2	21.4	30.8	
Total Snowfall[12] (cm)	0.0	20.6	1.3	
Greatest 24-hour Precipitation (mm)	20.0	17.6	29.6	44.2
Year-Day[20]	9/83	1982/28	—	1931/12
Years of Record[21]	1	1	16	87
Greatest 24-hour Rainfall (mm)	20.0	9.4	29.6	44.2
Year/Day[20]	9/83	1982/4	—	1931/12
Years of Record[21]	1	1	16	87
Greatest 24-hour snowfall (cm)	0.0	17.6	5.6	10.2
Year/Day[20]	-	1982/28	—	1926/2
Years of Record [21]	-	1	16	87
Precipitation Days [13]	11	6	9	
Rainfall Days[13]	11	4	9	
Snowfall Days[13]	0	2	1	
Total Evaporation[14](mm)	114.5	131.0	125.0	
Mean Wind Speed[15] (km/hr)	15.2	13.8	18.1	
Peak Gust Speed[16]	87.0	65	148	
Total Bright Sunshine[17] (hr)	178.2	188.4	191.0	
Percent Possible Bright Sunshine[18]	47.0	50	50	
Total Global Radiation[19] (Langleys)	8,622	9,323	9,780	
Soil Frozen?[22]	No	No	No	
Frozen Levels[23] (cm)	-	—	—	

SUMMARY:

The month of September was dominated by cooler than normal temperatures as we experienced 19 of 30 days with below normal temperatures. Also, gardeners had to be alert as there were twice as many days with frost as normal. In contrast the extreme maximum of 34.0°C on September 1/83 was only 1.6°C less than the record extreme and ended a hot spell that had continued from the latter part of August.

The Climate Reference Station has recorded 62.2 mm of precipitation (193% of the normal), with approximately 1/3 of the total falling on one day (September 9/83). This monthly total is the fourth highest on record since 1941.

The total bright sunshine hours is 5% less than the normal, and the global radiation is less than the normal by approximately 12%. This has resulted in a decrease in growing degree days by 16%, and an increase in heating degree days by 22% as compared to the normal September values.

Overall, September has been a cool month with above normal precipitation.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 11. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR OCTOBER 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE 1951-80	EXTREME ALL YEARS
Monthly mean Temperature[4] (°C)	5.3	5.5	5.2	
Monthly Mean Maximum Temperature[5] (°C)	11.9	11.5	11.1	
Monthly Mean Minimum Temperature[6] (°C)	-1.4	-0.5	-0.8	
Extreme[7] Maximum Temperature (°C)	20.0	21.0	28.3	32.2
Day/Year[20]	22/83	1982/13	—	1943/5
Years of Record[21]	1	1	17	87
Extreme[7] Minimum Temperature (°C)	-9.0	-6.5	-18.3	-25.6
Year/Day[20]	17/83	1982/20	—	1919/25
Years of Record[21]	1	1	17	87
Days with Frost[8]	21	19	19	
Heating Degree-Days[9] (18°C base)	394.5	385.0	398.0	
Growing Degree-Days[10] (5°C base)	43.5	60	71.1	
Total Precipitation[11] (mm)	6.4	12.2	17.5	
Total Rainfall[11]	6.4	1.7	7.7	
Total Snowfall[12] (cm)	Tr	10.5	10.3	
Greatest 24-hour Precipitation (mm)	3.8	3.0	25.4	34.0
Year-Day[20]	4/83	1982/8	—	1905/14
Years of Record[21]	1	1	17	87
Greatest 24-hour Rainfall (mm)	3.8	3.0	23.1	34.0
Year/Day[20]	4/83	1982/8	—	1905/
Years of Record[21]	1	1	17	87
Greatest 24-hour snowfall (cm)	Tr	1.0	22.9	10.2
Year/Day[20]	15/83	1982/1	—	
Years of Record [21]	1	1	17	
Precipitation Days [13]	6	7	5	
Rainfall Days[13]	6	7	3	
Snowfall Days[13]	-	3	3	
Total Evaporation[14](mm)	-	M	(May-Sept. Only)	
Mean Wind Speed[15] (km/hr)	12.3	13.3	18.0	
Peak Gust Speed[16]	59.0	65	138	
Total Bright Sunshine[17] (hr)	178.0	182.0	175.0	
Percent Possible Bright Sunshine[18]	54	69	53	
Total Global Radiation[19] (Langleys)	6,009	6,138	6,107	
Soil Frozen?[22]	no	No	Yes	
Frozen Levels[23] (cm)	-	—	5-10-20	

SUMMARY: October, 1983

We experienced below normal temperatures for approximately the first half of the month, and above normal temperatures for the latter two weeks. This resulted in a mean temperature of 5.3°C which is only slightly above the 30 yr. normal of 5.2°C. Although we enjoyed the warmer temperatures at this time of the year, we are also beginning to experience frost in the early mornings. C.R.S. recorded 21 days with frost during the month of October, with an extreme minimum temperature of -9.0°C on the 17th.

October has been drier than normal since we have received approximately one third of the 30 yr. normal monthly precipitation. The total precipitation of 435.9 mm to the end of October, however, is substantially higher than the normal annual total of 370.5 mm. Precipitation was in the form of rainfall except for a trace of snow observed on the 15th of October.

October has provided several days with temperatures above the normal, making autumn more enjoyable and helping us avoid thoughts about the inevitability of winter.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 12. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR NOVEMBER 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE 1951-80	EXTREME ALL YEARS
Monthly mean Temperature[4] (°C)	-2.9	-10.0	-5.5	
Monthly Mean Maximum Temperature[5] (°C)	-0.2	-5.0	-1.0	
Monthly Mean Minimum Temperature[5] (°C)	-5.6	-15.0	-10.0	
Extreme[7] Maximum Temperature (°C)	15.0	7.0	19.4	21.7
Day/Year[20]	4/83	1982/5	—	1903/3
Years of Record[21]	1	1	18	87
Extreme[7] Minimum Temperature (°C)	-18.5	-28.5	-32.8	-39.4
Year/Day[20]	25/83	1982/23	—	1893/30
Years of Record[21]	1	1	18	87
Days with Frost[8]	25	30	29	
Heating Degree-Days[9] (18°C base)	627.5	846.5	704.4	
Growing Degree-Days[10] (5°C base)	7.5	0.0	2.6	
Total Precipitation[11] (mm)	27.6	27.3	16.0	
Total Rainfall[11]	4.8	TR.	2.5	
Total Snowfall[12] (cm)	22.8	27.3	12.3	
Greatest 24-hour Precipitation (mm)	6.4	17.5	19.3	27.9
Year-Day[20]	27/83	1982/6	—	1938/1
Years of Record[21]	1	1	18	87
Greatest 24-hour Rainfall (mm)	2.6	TR.	14.5	14.5
Year/Day[20]	7/83	1982/6	—	1978/4
Years of Record[21]	1	1	18	87
Greatest 24-hour snowfall (cm)	6.4	17.5	13.2	27.9
Year/Day[20]	27/83	1982/6	—	1938/1
Years of Record[21]	1	1	18	87
Precipitation Days[13]	15	5	9	
Rainfall Days[13]	4	4(traces)	1	
Snowfall Days[13]	11	5	8	
Total Evaporation[14](mm)	M	M	(May-Sept. only)	
Mean Wind Speed[15] (km/hr)	12.9	12.2	16.9	
Peak Gust Speed[16]	55	62	100	
Total Bright Sunshine[17] (hr)	48.6	116.1	109.0	
Percent Possible Bright Sunshine[18]	18	44	41	
Total Global Radiation[19] (Langleys)	2353	3,663	3,090	
Soil Frozen?[22]	Yes	Yes	Yes	
Frozen Levels[23] (cm)	5	5,10,20	50 —	

SUMMARY:

Mean daily temperatures have been above normal for approximately the first 2/3 of the month. The mean temperature of -2.9°C is above normal compared to the 1951-80 normal of -5.5°C. Although cooler temperatures have dominated the last nine days, the mild temperatures experienced earlier in the month were very welcome.

C.R.S. has recorded 22.8 cm of snowfall, and 4.8 mm of rainfall for a total water equivalent of 27.6 mm. This value exceeds the normal 30 year total for November, by 13.4 mm. The total precipitation to the end of November is still greater than the normal annual total precipitation of 370.5 mm by approximately 25%. The bulk of the precipitation received this month has been in the form of snowfall.

A fact very apparent to everyone has been the lack of bright sunshine. We have received only 48.6 hours of sunshine which is less than one half of the sunshine normally received (1951-1980). The shortage of sunshine hours combined with shorter day lengths, has made the month appear quite dull.

LOCATION: 52°9'N, 106°36'W, 497m MSL

TABLE 13. SASKATCHEWAN RESEARCH COUNCIL
MONTHLY WEATHER SUMMARY FOR DECEMBER 1983

Element	1983 VALUE	1982 VALUE	NORMAL VALUE 1951-80	EXTREME ALL YEARS
Monthly mean Temperature[4] (°C)	-22.8	-11.7	-13.9	
Monthly Mean Maximum Temperature[5] (°C)	-18.0	-7.5	-9.3	
Monthly Mean Minimum Temperature[6] (°C)	-27.5	-15.9	-18.5	
Extreme[7] Maximum Temperature (°C)	- 6.5	3.5	8.0	14.4
Day/Year[20]	31/83	1982/16	—	1939/5
Years of Record[21]		1	18	87
Extreme[7] Minimum Temperature (°C)	-39.5	-33.0	-44.4	-44.4
Year/Day[20]	23/83	1982/8	—	1892/22
Years of Record[21]	1	1	18	87
Days with Frost[8]	31	31	31	
Heating Degree-Days[9] (18°C base)	1263.5	924.5	991.9	
Growing Degree-Days[10] (5°C base)	0	0.0	0.0	
Total Precipitation[11] (mm)	8.1	14.8	25.8	
Total Rainfall[11]	0	1.2	0.8	
Total Snowfall[12] (cm)	8.1	13.6	23.1	
Greatest 24-hour Precipitation (mm)	4.4	4.8	14.5	20.6
Year-Day[20]	10/83	1982/22	—	1936/24
Years of Record[21]	1	1	18	87
Greatest 24-hour Rainfall (mm)	0	1.2	4.3	4.8
Year/Day[20]	-	1982/16	—	1956/26
Years of Record[21]	-	1	18	87
Greatest 24-hour snowfall (cm)	4.4	4.8	14.5	20.6
Year/Day[20]	10/83	1982/22	—	1936/24
Years of Record[21]	1	1	18	87
Precipitation Days[13]	9	17	13	
Rainfall Days[13]	0	1	1	
Snowfall Days[13]	9	16	12	
Total Evaporation[14](mm)	M	M	(May-Sept. only)	
Mean Wind Speed[15] (km/hr)	12.0	12.7	16.8	
Peak Gust Speed[16]	50.0	63	97	
Total Bright Sunshine[17] (hr)	76.8	52	86	
Percent Possible Bright Sunshine[18]	32	22	36	
Total Global Radiation[19] (Langleys)	2,541	1,945	2,294	
Soil Frozen?[22]	Yes	Yes	Yes	
Frozen Levels[23] (cm)	5,10,20,50	5,10,20,50		

SUMMARY:

* Less than a day over period

December can be remembered for its cold temperatures as we experienced 28 of 31 days with below normal temperatures. Temperatures dipped to an extreme minimum of -39.5°C on the 23rd which broke the record minimum for that day on record since 1892. The maximum temperature of -6.5°C was finally experienced when the cold snap broke near the end of the month. The mean, mean maximum and mean minimum temperatures were all substantially colder than normal values experienced from 1951-80.

8.1 mm of precipitation fell at C.R.S. in the form of snow, with almost one half of that falling on the 10th. This total is less than one-third of the normal monthly value of 25.8 mm. As of the end of December, the total precipitation recorded at C.R.S. was 471.6 mm which exceeds the annual total of 370.5 mm by approximately 27%. Overall, 1983 has been wetter than normal.

TABLE 14. Soil Temperature and Snow Cover at Saskatoon SRC, January 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-5.3	6.5	31	1	20
10	-4.9	6.5	31	5	21
20	-4.1	6.5	31	10	20
50	-2.5	1.5	31	15	20
100	0.1	1.0	19	20	20
150	1.7	1.0	0	25	34
300	4.5	2.0	0	31	24

TABLE 15. Soil Temperature and Snow Cover at Saskatoon SRC, February 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-4.6	5.5	31	1	25
10	-4.3	5.5	31	5	27
20	-3.7	5.5	31	10	28
50	-2.9	1.5	31	15	21
100	-0.6	0.5	31	20	30
150	0.7	0.5	0	25	24
300	3.4	1.0	0	28	27

TABLE 16. Soil Temperature and Snow Cover at Saskatoon SRC, March 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	-2.8	6.0	31	1	27
10	-2.5	5.0	31	5	28
20	-2.0	5.5	28	10	28
50	-1.7	0.5	31	15	25
100	-0.1	0.5	5	20	25
150	0.8	0.5	0	25	32
300	2.8	1.0	0	31	20

TABLE 17. Soil Temperature and Snow Cover at Saskatoon SRC, April 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	4.1	14.0	12	1	19
10	4.4	14.0	3	5	7
20	4.0	11.0	8	10	8
50	2.7	8.5	12	15	T
100	1.6	4.5	6	20	T
150	1.4	2.5	0	25	0
300	2.6	0.5	0	30	T

TABLE 18. Soil Temperature and Snow Cover at Saskatoon SRC, May 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	9.6	15.0	0	1	0
10	10.2	14.0	0	5	0
20	9.3	11.5	0	10	14 (22 cm on 11th May)
50	7.3	6.5	0	15	0
100	5.4	3.5	0	20	0
150	4.2	3.0	0	25	0
300	3.5	1.0	0	31	0

TABLE 19. Soil Temperature and Snow Cover at Saskatoon SRC, June 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	16.2	12.0	0	1	0
10	16.3	10.5	0	5	0
20	15.3	7.0	0	10	0
50	12.7	4.5	0	15	0
100	9.7	5.5	0	20	0
150	7.7	3.5	0	25	0
300	5.0	2.0	0	30	0

TABLE 20. Soil Temperature and Snow Cover at Saskatoon SRC, July 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	19.0	8.0	0	1	0
10	19.7	8.5	0	5	0
20	18.6	5.5	0	10	0
50	16.7	3.5	0	15	0
100	13.3	2.5	0	20	0
150	10.9	2.5	0	25	0
300	7.4	2.5	0	31	0

TABLE 21. Soil Temperature and Snow Cover at Saskatoon SRC, August 1983.

Depth (cm)	Mean Temp. (°C)	Range (°C)	Frost Days	Date	Snow Depth (cm)
5	19.1	12.0	0	1	0
10	19.7	11.0	0	5	0
20	18.9	6.0	0	10	0
50	17.3	3.0	0	15	0
100	14.3	0.5	0	20	0
150	12.4	1.0	0	25	0
300	9.0	1.5	0	31	0

TABLE 22. Soil Temperature and Snow Cover at Saskatoon SRC, September 1983.

Depth (cm)	Mean Temp. (^{o}C)	Range (^{o}C)	Frost Days	Date	Snow Depth (cm)
5	11.1	17.0	0	1	0
10	11.7	17.0	0	5	0
20	11.9	13.5	0	10	0
50	13.0	10.0	0	15	0
100	12.6	4.0	0	20	0
150	12.1	2.5	0	25	0
300	10.1	0.5	0	30	0

TABLE 23. Soil Temperature and Snow Cover at Saskatoon SRC, October 1983.

Depth (cm)	Mean Temp. (^{o}C)	Range (^{o}C)	Frost Days	Date	Snow Depth (cm)
5	5.2	7.5	0	1	0
10	5.8	7.0	0	5	0
20	6.3	6.0	0	10	0
50	7.8	3.5	0	15	0
100	8.8	3.0	0	20	0
150	9.2	2.5	0	25	0
300	9.4	1.0	0	31	0

TABLE 24. Soil Temperature and Snow Cover at Saskatoon SRC, November 1983.

Depth (cm)	Mean Temp. (^{o}C)	Range (^{o}C)	Frost Days	Date	Snow Depth (cm)
5	1.7	7.0	4	1	0
10	2.4	7.0	4	5	0
20	3.0	6.5	0	10	3
50	4.7	3.5	0	15	0
100	6.1	2.0	0	20	4
150	7.0	2.0	0	25	6
300	8.2	1.5	0	30	9

TABLE 25. Soil Temperature and Snow Cover at Saskatoon SRC, December 1983.

Depth (cm)	Mean Temp. (^{o}C)	Range (^{o}C)	Frost Days	Date	Snow Depth (cm)
5	-6.4	13.0	31	1	9
10	-5.6	13.0	29	5	7
20	-4.4	13.0	26	10	8
50	-0.6	7.5	16	15	8
100	3.0	4.5	0	20	8
150	4.5	3.5	0	25	8
300	6.7	1.5	0	30	8

TABLE 26. Diffuse Solar Radiation (Langleys/Day) at Saskatoon SRC, 1983.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	46.7	81.2	131.7	145.8	201.9	284.0	303.7	128.1	157.0	76.6	46.2	57.0
2	54.4	77.4	139.3	158.2	216.0	206.5	136.3	347.0	96.9	108.2	30.1	35.2
3	42.7	130.5	178.1	172.4	238.6	137.5	164.2	302.5	94.0	90.2	69.7	47.2
4	44.7	118.1	167.1	130.7	203.7	270.9	247.3	279.3	90.8	96.3	45.7	42.1
5	60.7	142.0	131.4	120.4	178.3	191.9	112.6	237.1	120.2	68.8	34.3	51.3
6	41.6	122.3	161.4	103.2	172.4	149.7	165.4	130.4	171.1	130.2	48.4	41.2
7	52.7	132.7	209.6	111.6	201.0	136.0	102.1	164.4	76.9	76.5	96.7	47.6
8	48.0	118.9	185.4	154.2	146.6	151.4	149.1	198.4	171.8	50.0	54.1	37.0
9	44.5	127.0	205.7	180.2	191.9	210.4	170.3	105.4	46.9	98.4	64.0	41.4
10	55.1	112.5	162.2	106.3	291.3	217.4	96.0	237.1[e]	134.2	70.6	46.4	33.7
11	48.8	102.6	160.5	218.3	205.4	184.9	142.2	128.2[e]	184.1	89.0	45.5	35.2
12	59.2	148.0	129.7	176.9	317.5	174.0	204.0	113.5	133.9	46.7	61.2	35.9
13	56.8	116.2	169.6	179.8	210.8	222.0	160.2	97.7	110.5	61.9	36.3	42.4
14	56.0	93.9	96.2	216.3	243.4	202.8	255.7	122.4	112.3	88.7	24.6	47.7
15	45.3	110.9	118.0	150.3	160.1	109.3	289.4	132.7	164.5	69.6	39.7	49.5
16	50.1	118.1	143.3	279.2	231.5	110.4	233.1	125.2	126.9	60.2	34.8	41.1
17	71.2	105.9	233.6	205.6	211.0	150.3	188.0	100.6	57.5	54.3	36.6	49.6
18	57.6	100.9	211.7	102.1	203.7	179.5	152.2	164.2	126.7	95.4	22.3	38.4
19	66.1	110.5	146.8	133.8	202.4	180.8	115.2	70.2	104.4	47.6	38.8	36.3
20	40.2	134.7	210.2	211.1	265.0	247.1	198.5	104.9	75.3	98.8	60.4	52.7
21	47.6	100.7	169.7	131.6	242.8	263.0	179.8	204.9	81.2	80.5	72.1	48.4
22	37.0	114.1	228.6	173.8	287.5	243.3	204.0	85.9	83.8	87.7	77.7	57.4
23	74.7	88.4	205.9	193.6	269.0	274.1	245.1	142.9	84.5	74.5	49.4	49.1
24	63.0	116.4	232.8	183.4	146.6	150.4	310.9	147.3	86.0	44.9	71.7	40.0
25	69.8	82.5	152.4	85.9	214.9	327.4	300.2	145.2	99.5	58.6	84.9	46.4
26	96.3	89.1	138.1	290.5	198.3	229.5	256.9	118.9	86.6	67.4	64.5	42.0
27	88.7	144.8	124.2	264.7	137.5	294.0	216.2	134.0	95.7	80.4	53.7	45.0
28	85.1	144.7	181.3	267.0	147.7	252.8	255.0	150.9	86.7	44.8	69.5	42.8
29	75.8		206.9	163.5	225.3	277.0	153.7	78.1	78.2	33.9	65.2	34.3
30	74.3		125.7	173.5	265.9	212.1	119.8	94.2	145.5	36.7	62.3	59.5
31	62.0		201.3		239.4		214.2	156.6		40.7		54.6
Total Diffuse	1816.7	3185.0	5258.4	5183.9	6667.4	6240.4	6041.3	4748.2	3189.6	2228.1	1606.8	1382.0
Total Global	2775	4137	8460	12921	15072	15199	16350	14184	8622	6009	2353	2541

[e]= estimate

TABLE 27. Some Significant Climatic Events, 1983.

FROST FREE SEASON

	Last Spring Frost	First Fall Frost	Length of Season
1983	May 24	September 13	111 days
1982	May 29	August 27	89 days

SNOW SEASON

Greatest Depth of Snow on Ground (cm)

	Jan.	Feb.	Mar.	Apr.	May	Sept.	Oct.	Nov.	Dec.
1983	24	25	35	20	22	0	0	9	8
1982	12	11	18	10	11	10	0	6	22

	Cessation[1] of Snow Pack*	Last Spring Snowfall	First Fall Snow	Onset[2] of Snow Pack
1983	April 16	May 10	November 10	November 19
1982	March 25	May 30	September 28	November 7

*22 cm on ground May 11, 1983

WEATHER "SPELLS"[3,4]

	1983	1982
Longest Cool Spell:	26 days, Nov. 28 - Dec. 24	13 days, Jan. 1-13
Longest Warm Spell:	34 days, Feb. 9 - Mar. 15	9 days, Feb. 16-24
Longest Dry Spell:	16 days, Sept. 18 - Oct. 3	21 days, Sept. 7-27
Longest Wet Spell:	9 days, Feb. 27 - Mar. 7	7 days, Aug. 17-23

1. First day on the first interval of at least 5 days duration in which snow cover is reduced to less than 1 cm depth.

2. First day of the first interval of at least 5 days duration in which snow cover equals or exceeds 1 cm depth.

3. Temperature "spells" are defined as a sequence of days when the daily mean temperature during the year in question is higher (warm spell) or lower (cold spell) than the long-term daily mean for the date in question.

4. Precipitation "spells" are defined as the sequence of days with precipitation amounts greater than trace (wet spells) or precipitation amounts of trace or less (dry spells).

TABLE 28. Mean Hourly Wind Speed (km/hr) for 16 Compass Points, 1983.

Direction	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
N	14.7	9.3	11.5	18.0	14.0	14.4	11.0	9.4	15.9	12.5	11.9	15.1	13.5
NNE	12.0	12.9	15.6	18.0	21.0	11.7	15.9	10.0	7.9	9.1	10.5	12.4	14.4
NE	11.1	15.0	17.6	22.7	16.4	14.6	12.1	10.2	8.3	7.9	12.6	13.5	14.3
ENE	7.2	17.2	15.9	18.0	15.4	12.1	13.3	7.6	8.4	11.5	11.3	4.6	13.0
E	6.2	14.3	9.1	9.7	14.3	15.3	16.2	6.9	11.1	8.4	12.3	4.6	11.3
ESE	12.8	17.2	19.6	17.9	13.8	14.8	19.5	10.7	13.1	11.2	13.0	12.3	15.7
SE	16.9	17.4	20.6	20.1	13.6	13.6	15.4	14.3	14.7	16.5	19.8	14.5	17.3
SSE	14.6	16.3	19.2	14.8	14.6	17.9	13.8	13.0	12.6	12.6	16.1	7.3	14.7
S	9.2	13.8	8.5	12.4	16.6	18.4	10.5	8.8	10.4	12.6	14.4	8.8	12.4
SSW	8.1	11.1	9.3	11.3	14.8	18.5	11.3	8.9	10.8	10.4	11.9	10.7	11.6
SW	8.8	12.1	12.5	9.0	11.7	15.3	14.4	12.7	13.2	10.7	11.9	11.9	12.2
WSW	7.0	10.3	12.5	5.9	10.5	16.5	16.0	12.6	13.4	10.6	10.4	13.7	12.8
W	10.7	11.6	6.5	7.6	9.5	13.8	15.2	11.5	18.6	10.5	10.0	13.9	12.7
WNW	12.1	13.7	7.4	11.9	10.7	16.6	16.2	16.3	22.8	15.2	10.4	12.7	14.6
NW	16.6	10.3	7.4	14.7	14.2	16.8	13.3	14.9	24.2	16.4	10.7	12.4	15.8
NNW	11.8	7.3	10.8	17.2	12.8	15.9	11.4	12.4	18.9	12.6	10.9	9.9	13.5
ALL	11.7	14.5	16.5	15.6	15.0	15.5	14.2	11.7	15.9	12.5	12.9	12.0	14.0

NOTE: Anemometer height is 10 m

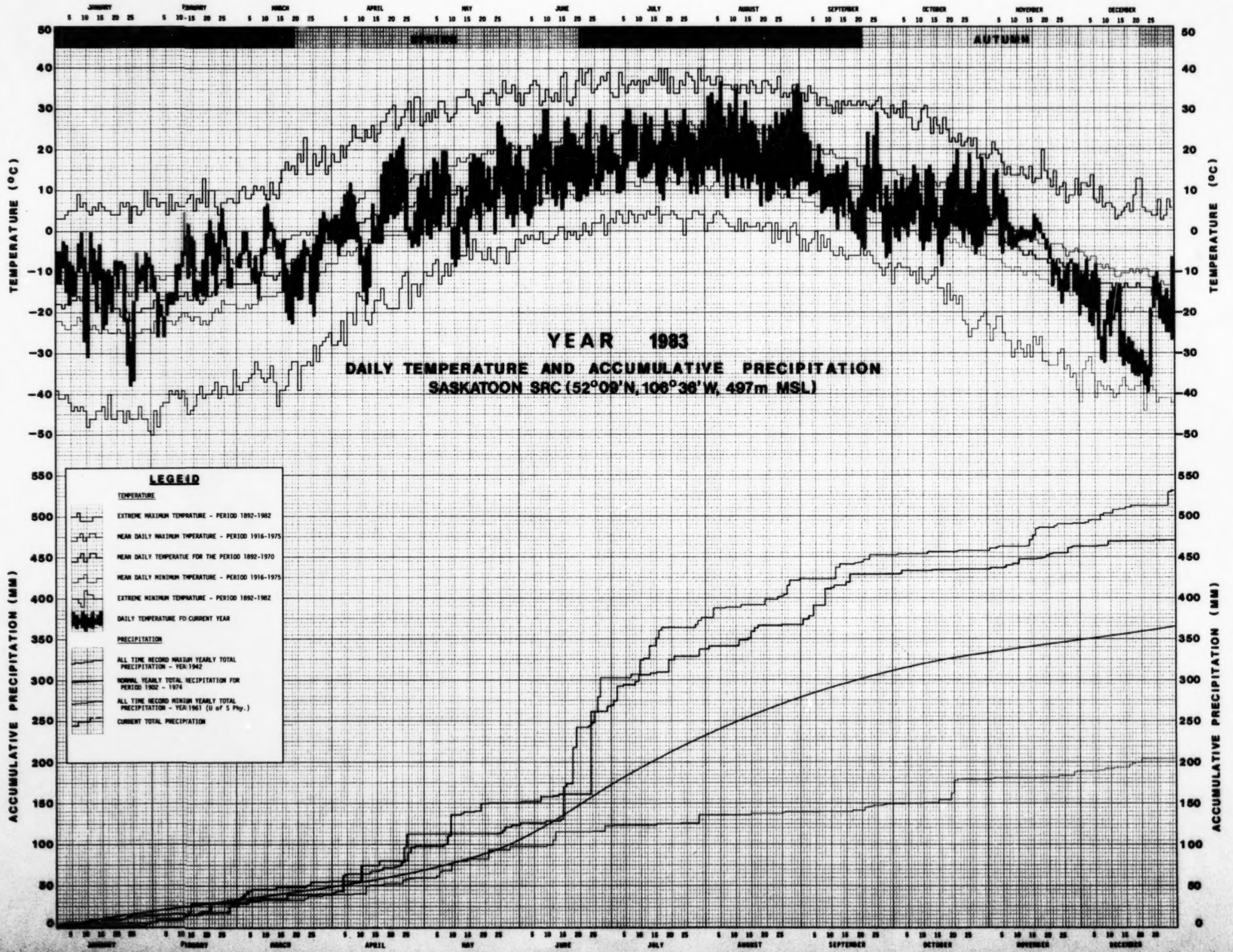
TABLE 29. Percentage Frequency of Winds from 16 Compass Points, 1983.

Direction	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
N	5.4	2.4	3.5	5.6	6.9	6.5	3.0	4.6	3.1	1.4	5.6	3.0	4.2
NNE	9.1	10.6	17.3	6.8	16.7	4.4	5.1	8.2	2.4	3.4	9.6	5.0	8.2
NE	5.1	10.7	10.5	3.8	5.8	4.0	2.1	4.2	1.7	3.1	9.3	3.9	5.3
ENE	2.2	7.3	4.8	3.9	6.1	3.8	2.2	2.3	3.4	2.3	6.3	2.0	3.8
E	1.6	5.1	1.9	2.5	3.0	3.8	1.7	2.4	2.4	2.0	1.8	1.9	2.5
ESE	5.4	12.8	9.5	10.3	5.1	7.8	6.6	3.5	4.2	4.6	4.7	3.3	6.4
SE	15.3	15.2	28.4	21.8	4.3	11.5	12.0	14.0	9.2	9.5	12.1	6.4	13.3
SSE	9.3	7.7	8.2	8.3	5.0	6.9	6.1	11.5	7.8	12.1	10.3	3.0	8.0
S	4.4	5.8	1.9	7.2	7.9	5.8	6.1	6.2	7.5	10.7	4.7	4.7	6.1
SSW	9.8	6.7	1.7	7.4	9.8	10.0	11.3	9.6	12.7	12.5	4.3	7.7	8.6
SW	4.3	2.2	0.5	1.5	4.8	4.7	6.5	4.2	3.6	5.0	2.9	5.7	3.9
WSW	3.1	2.4	1.1	1.5	3.5	5.7	11.1	3.8	4.2	5.7	3.2	5.8	4.3
W	4.4	2.7	1.3	1.7	2.6	3.5	8.6	4.7	5.3	5.2	3.8	8.3	4.3
WNW	6.7	4.5	2.7	2.4	6.9	5.8	7.9	9.6	14.5	12.3	9.5	25.2	9.0
NW	5.5	1.8	2.7	4.3	6.9	7.4	5.4	5.5	13.7	7.2	5.7	10.2	6.4
NNW	3.4	1.0	2.6	6.5	4.2	7.8	2.9	3.6	4.2	2.3	5.6	3.9	4.0
CALM	5.0	1.2	1.3	4.6	0.7	0.6	1.4	2.0	0.1	0.7	0.7	0.0	1.5

NOTE: Anemometer height is 10 m

FIGURE 1. Year 1983 Daily Temperature and Cumulative Precipitation.

In order to present the maximum length of climatic record for the Saskatoon area, data from several sources has been pooled to produce the historic record shown in this Figure. For data sources please refer to Footnotes for Climatic Tables, note 3. The seasons shown are defined on an astronomical basis.


JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
WINTER
AUTUMN
TEMPERATURE (°C)
ACCUMULATIVE PRECIPITATION (MM)
YEAR 1983
DAILY TEMPERATURE AND ACCUMULATIVE PRECIPITATION
SASKATOON SRC (52°09'N, 106°36'W, 497m MSL)
LEGEND
TEMPERATURE
EXTREME MAXIMUM TEMPRATURE - PERIOD 1892-1982
MEAN DAILY MAXIMUM TMPERATURE - PERIOD 1916-1975
MEAN DAILY TEMPERATUE FOR THE PERIOD 1892-1970
MEAN DAILY MINIMUM TMPERATURE - PERIOD 1916-1975
EXTREME MINIMUM TEMPRATURE - PERIOD 1892-1982
DAILY TEMPERATURE FO CURRENT YEAR
PRECIPITATION
ALL TIME RECORD MAXIUM YEARLY TOTAL PRECIPITATION - YEA:1942
NORMAL YEARLY TOTAL RECIPITATION FOR PERIOD 1902 - 1974
ALL TIME RECORD MINIUM YEARLY TOTAL PRECIPITATION - YEA:1961 (U of S Phy.)
CURRENT TOTAL PRECIPITATION